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REMARKS

Claims 1-4, 7-9, 12 and 15-22 are pending in this application. Claims 1-4 stand rejected under 35 USC 112, first and second paragraphs. Claim 1 stands rejected under 35 USC 102(b) as being anticipated by Cairo. Claims 1-4 stand rejected under 35 USC 102(b) as being anticipated by Ryan. Claims 7-9 and 12 stand rejected under 35 USC 103(a) as being unpatentable over Ryan in view of Sabol. Claims 15-21 stand rejected under 35 USC 103(a) as being unpatentable over Ryan in view of Bampton. Claim 22 stands rejected under 35 USC 103(a) as being unpatentable over Ryan in view of Bampton and Sabol.

Rejections under 35 USC 112, first paragraph:

The rejection of claims 1-4 under 35 USC 112, first paragraph, is predicated upon the Examiner's belief that there is no support for the limitation that "the melting point depressant material comprising nickel-boron." The Examiner's attention is directed to page 4, line 21 of the specification where support is provided for this limitation. Accordingly, withdrawal of this rejection is respectfully requested.

Rejections under 35 USC 112, second paragraph:

The Examiner explains the rejection of claims 1-4 under 35 USC 112, second paragraph, as being because it is unclear how the limitation involving nickel-boron corresponds to the disclosed invention or how nickel-boron relates to the consumable insert. As described at page 4, lines 17-27 of the specification, nickel-boron is one possible melting point depressant material that can be used in the consumable insert, particularly for the embodiment where nickel-boron is formed during flattening of the sheath by diffusion of some of a boron melting point depressant into the nickel sheath material. The resulting composite consumable insert thus includes nickel-boron as its melting point depressant material, which is directly related to the disclosed invention. Thus, the rejection under 35 USC 112, second paragraph, appears to be without merit, and reconsideration and withdrawal of this rejection is respectfully requested.

Rejection of claim 1 under 35 USC 102 in view of Cairo:

Cairo describes a consumable insert foil that has a uniform concentration of boron throughout its thickness when it is formed. Cairo describes how such a uniform foil is used during a joining process at column 6, lines 33-53 cited by the Examiner. Cairo clearly states at column 6, lines 37-40 that at the instant of melting the concentration of boron is uniform through the thickness of the foil. Thus, Cairo teaches away from the consumable insert of claim 1 which includes "a concentration that is greater proximate a center region of the consumable insert than proximate an exterior surface region of the consumable insert."

Cairo goes on to describe how diffusion of the boron into the substrate material occurs after melting, and as time proceeds, the concentration of boron remains highest at the center "of the melted joint." Thus, the Examiner is basing the rejection of claim 1 on the chemistry conditions of the melted joint, whereas claim 1 is directed to a consumable insert as it exists prior to its incorporation into a melted joint. The "melted joint" of Cairo includes material from the consumable insert as well as at least some melted material from the substrate material, since without at least some melting of the substrate material there would be no joint formed. The near-surface substrate material melts locally as the boron concentration of the consumable insert diffuses through the near-surface material into the bulk material of the substrate. Thus, the foil of Cairo teaches away from the consumable insert of claim 1 and the melted joint of Cairo is distinct from the foil itself and can not anticipate a consumable insert having the claimed non-uniform concentration of nickel-boron. Claim 1 has been amended to add the word "foil" to clarify this distinction. Reconsideration and withdrawal of this rejection is respectfully requested.

Rejection of claims 1-4 under 35 USC 102 in view of Ryan:

Ryan describes the use of multiple foils (see column 1, line 53) wherein each foil has a boronized surface (column 2, line 37), i.e. a higher concentration of boron near the surface of the foil than in the center of the foil. Claims 1-4 have been amended herein to clarify that it is a consumable insert foil being claimed, and the claimed foil has a concentration of melting point depressant material that is greater proximate a center region of the insert than proximate the exterior surface region of the foil. Thus, Ryan teaches away from claims 1-4 because each foil of Ryan has the opposite gradient of melting point depressant than that which is claimed. The fact that Ryan uses two such foils in a single joint does not anticipate the consumable insert foil of claims 1-4. The present invention provides all of the benefits of the process of Ryan without the need to use multiple foils. Furthermore, the foil of claims 1-4 avoids the problematic concentrations of melting point depressant that exist on the very top and very bottom surfaces of the dual-foils of Ryan. Thus, the rejections under 35 USC 102 are not supported by the art and their withdrawal is respectfully requested.

Rejection of claims 7-9 and 12 under 35 USC 103 in view of Ryan and Sabol:

The Examiner interprets Sabol as teaching a "transient liquid phase consumable insert made of MCrAlY alloy material…for joining nickel based alloys..." To the contrary, Sabol teaches an MCrAlY coating 14 for the protection of an underlying metal substrate 12. There is no teaching of a consumable insert in the sense that such term is used in the present specification and in the art of joining of materials. The MCrAlY coating 14 of Sabol is deposited onto the surface 22 of the substrate 12, and the boron content of the coating allows it to densify upon heating. There is incidental diffusion of some of the boron into the substrate along surface 22 during the heating/densification process, but this is not a transient liquid phase joining process for joining nickel based alloys, but rather simply a coating process for a single alloy substrate. The densification step is not even a joining process because the MCrAlY is already joined to the substrate prior to densification.

Moreover, the combination of Ryan and Sabol is not taught or suggested in the art and there is no *prima facie* basis for this rejection under 35 USC 102. Ryan describes adding boron to a consumable insert foil surface to lower its melting temperature. Sabol describes adding boron to an MCrAlY coating to lower its melting temperature. The Examiner suggests that the combination of Ryan and Sabol would suggest the use of the MCrAlY material of Sabol in the consumable insert of Ryan. However, such a combination would destroy the functionality of the Ryan consumable insert, because it would raise its melting temperature. MPEP 2143.01 provides that the mere fact that references can be combined does not render the resultant combination obvious unless the prior art suggests the desirability of the combination. The Federal Circuit has consistently held that a modification of a reference that destroys the intent, purpose or function of the invention disclosed in the reference is not proper. Here, the addition of MCrAlY alloy material in the consumable insert of Ryan would raise the melting temperature of the insert, thereby destroying its functionality as a low melting temperature consumable insert for forming transient liquid phase joints. As described beginning at page 5, line 11 of the present specification, the present inventors have recognized that the claimed consumable insert is useful not only for transient liquid phase bonding processes, but also for the deposition of non-ductile materials. The increase of melting temperature is not problematic in such a material deposition application. It is this aspect of the invention that is claimed in claims 7-9 and 12, and such a combination is not taught or suggested in the art.

Since there is no *prima facie* support for the proposed combination of references, withdrawal of these rejections is respectfully requested.

Rejection of claims 15-21 under 35 USC 103 in view of Ryan and Bampton:

The combination of Ryan and Bampton fails to provide *prima facie* support for the rejection of any of claims 15-21.

Ryan describes the use of two typical prior art foils at the same time. The melting point depressant material of Ryan can not be in powder form because it would not remain in place on the bottom of the respective foils. Bampton describes the use of a transient liquid consolidation utilizing a powdered bonding agent.

The combination of Ryan and Bampton fails to describe the flattening of a tube as in claims 15-17, or the flattening of a U-shaped plate as in claim 18, or the flattening of upper and lower plates together to a desired thickness after depositing particles there between of claims 19-21, or the sealing of adjoining edges of upper and lower plates together to capture particles there between prior to flattening of claim 20. The lack of such essential elements of each claim indicates that the rejections under 35 USC 103 are not supported by the art, and the withdrawal of these rejections is respectfully requested.

Rejection of claim 22 under 35 USC 103 in view of Ryan and Bampton and Sabol:

The use of the MCrAlY material of Sabol in the consumable insert of Ryan or in the bonding agent of Bampton would destroy the functionality of such consumable insert or bonding agent, since the melting point of the insert or bonding agent would increase. Thus, the combination of Ryan with Bampton and Sabol is not motivated by the art and does not support a *prima facie* case for obviousness. Reconsideration and withdrawal of this rejection is respectfully requested.

Conclusion

Entry of the claim amendments presented herein and allowance of claims 1-4, 7-9, 12 and 15-22 are respectfully requested.

Respectfully submitted,

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